TSMC-01-1247

December 1, 2003

To: Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Fr: George O. Saile, Reg. No. 19,572
28 Davis Avenue
Poughkeepsie, N.Y. 12603

Subject: | Serial No. 10/657,505 09/08/03 |

Chii-Ming Wu et al.

METHOD OF MANUFACTURING A CONTACT INTERCONNECTION LAYER CONTAINING A METAL AND NITROGEN BY ATOMIC LAYER DEPOSITION FOR DEEP SUB-MICRON SEMICONDUCTOR TECHNOLOGY

INFORMATION DISCLOSURE STATEMENT

Enclosed is Form PTO-1449, Information Disclosure Citation In An Application.

The following Patents and/or Publications are submitted to comply with the duty of disclosure under CFR 1.97-1.99 and 37 CFR 1.56. Copies of each document is included herewith.

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on December 8, 2003.

Stephen B. Ackerman, Reg.# 37761

Signature/Date 12/8/03

Patent Application TSMC-01-1248, Serial No. 10/653,852, File Date 09/03/03, assigned to a common assignee, "Method of Multi-Element Compound Deposition by Atomic Layer Deposition for IC Barrier Layer Applications," is related to this Patent Application.

U.S. Patent 5,998,871 to Urabe, "Metal Plug Electrode in Semiconductor Device and Method for Forming the Same," describes a metal plug comprised of TiN.

U.S. Patent 6,037,252 to Hillman et al., "Method of Titanium Nitride Contact Plug Formation," discusses a TiN contact that is deposited by a one or two step CVD or plasma enhanced CVD process.

U.S. Patent 6,203,613 to Gates et al., "Atomic Layer Deposition with Nitrate Containing Precursors," metal nitrate-containing precursor compounds are employed in atomic layer depositions processes to form metal-containing films, e.g. metal, metal oxide, and metal nitride, which films exhibit an atomically abrupt interface and an excellent uniformity.

U.S. Patent 6,270,572 to Kim et al., "Method for Manufacturing Thin Film Using Atomic Layer Deposition," discloses a thin film manufacturing method.

U.S. Patent 6,468,924 to Lee et al., "Methods of Forming Thin Films by Atomic Layer Deposition," discloses methods of forming thin films.

U.S. Patent 6,174,809 to Kang et al., "Method for Forming Metal Layer Using Atomic Layer Deposition," discloses a method for forming a metal layer using an atomic layer deposition process.

U.S. Patent 6,399,491 to Jeon et al., "Method of Manufacturing a Barrier Metal Layer Using Atomic Layer Deposition," discloses a method of manufacturing a barrier metal layer using atomic layer deposition (ALD) as the mechanism for depositing the barrier metal.

U.S. Patent 6,139,700 to Kang et al., "Method of and Apparatus for Forming a Metal Interconnection in the Contact Hole of a Semiconductor Device," discloses a method and an apparatus of fabricating a metal interconnection in a contact hole of a semiconductor device which reduces contact resistance and improves step coverage.

Sincerely,

Stephen B. Ackerman,
Reg. No. 37761

Form PTO-1449

INFORMATION DISCLOSURE CITATION IN AN APPLICATION

(Use several sheets if necessary)

DEC 10 2003

Docket Number (Optional)	Application Number
TSMC-01-1247	10/657,505
Applicant: Chii-Ming Wu et al.	
Filing Date: 09/08/03	Group Art Unit:

U. S. PATENT DOCUMENTS

Examiner Initial*	Document Number	Date	Name	Class	Subclass	Filing Date if Appropriate
	5998871	12/7/99	Urabe	257	754	2/20/98
	6037252	3/14/00	Hillman et al.	438	637	11/5/97
	6203613	3/20/01	Gates et al.	117	104	10/19/99
	6270572	8/7/01	Kim et al.	117	93	8/9/99
	6468924	10/22/02	Lee et al.	438	763	5/31/01
	6174809	1/16/01	Kang et al.	438	682	12/15/98
	6399491	6/4/02	Jeon et al.	438	680	4/6/01
	6139700	10/31/00	Kang et al.	204	192.17	9/30/98

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Document Number	Date	Country	Class	Subclass	Translation YES	Translation NO

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

Examiner Initial*	
	Patent Application TSMC-01-1248, Serial# 10/653,852, File Date 09/03/03, assigned to a common assignee, "Method of Multi-Element Compound Deposition by Atomic Layer Deposition for IC Barrier Layer Applications".

EXAMINER	DATE CONSIDERED

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP § 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to the applicant.